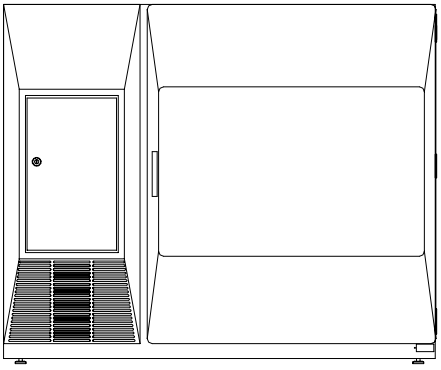
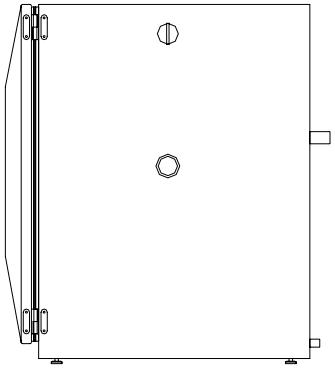
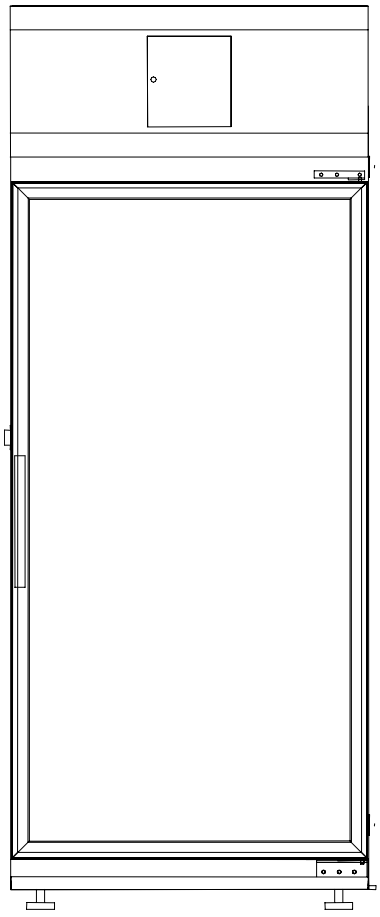
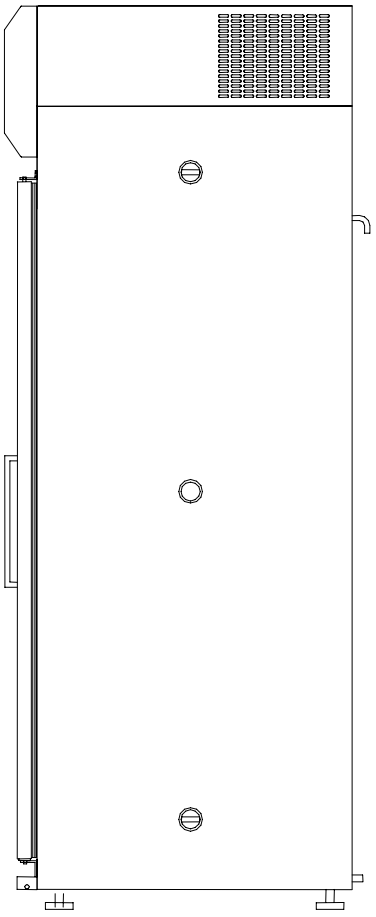
CARON 6000 SERIES
ENVIRONMENTAL TEST CHAMBERS









MODELS 6010, 6011, 6012, 6030, 6031, & 6032
OPERATIONS MANUAL

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INTRODUCTION

The CARON 6010 & 6030 series Environmental Test Chambers provide multiple capabilities to create repeatable environmental conditions for numerous applications including:

- Product shelf life
- Stability and package testing
- Light exposure and temperature evaluation studies
- Electronic component burn-in
- TAPPI testing
- Photostability
- Plant growth
- Insect rearing

These chambers utilize environmentally friendly HFC refrigerant and CFC-Free insulation, and is designed to meet NEC, UL and CSA standards for safety and performance.

Controlling the chamber temperature requires the ability to heat and cool. Heating of the chamber is achieved by duct heaters, and cooling is achieved by a direct expansion/vapor compression refrigeration heat exchanger mounted in the duct, combined with horizontal airflow pattern which creates better air uniformity, and temperature control.

A bi-modal controller (single input - dual output) is necessary for proper control of the system that can drive the process variable in either direction. The refrigeration system uses a single condensing unit that will allow independent cooling and dehumidification. This insures continuous, safe and reliable operation of the compressor even when no cooling is required. This also prevents the compressor from rapid cycling “on” and “off” which shortens the compressor life.

SYMBOLS AND WARNINGS

Warning of hazardous area

Warning of dangerous electric voltage

Earth (ground) protective conductor

Local government may require proper electrical component disposal

CHAMBER CONSTRUCTION

The chamber is a custom designed sheet metal package. Exterior metal is Cold Rolled Steel (CRS) with a powder coat finish for corrosion resistance. The chamber interior is constructed from 304 stainless steel, with all joints seam welded. The chamber face connecting the interior to the exterior is magnetic stainless steel providing a sealing surface for the magnetic gasketed exterior door as well as improved corrosion resistance. The control panel housing is constructed from aluminum with a powder coat finish. The chamber is insulated on all sides with fiberglass insulation rated at 70°C.

SHELF CONSTRUCTION (STANDARD)

The chamber shelves are polished, 304 stainless steel wire formed.

REFRIGERATION SYSTEM

A bi-modal refrigeration system allows for independent heating and cooling. This system is now used to replace the less sophisticated type of refrigeration system which used heaters to buck against the refrigeration system and assist in temperature control. The new design allows the chamber to respond faster and controls the chamber more efficiently at a constant temperature.

CONTROL SYSTEM

The control system is comprised of a single channel, dual output controller. On/off outputs are used to drive heaters and cooling solenoids.

SAFETIES

The CARON 6000 Series has a triple redundancy safety system. A temperature alarm in the temperature controller sounds an alarm to alert the end user to the condition. A thermal snap disk, high limit and a thermal fuse are provided to prevent run-away heating of the unit. The compressor and blower motors are both protected by thermal overloads. The Condenser fan motor is impedance protected.

MODEL 6010 SPECIFICATIONS

Temperature Range without lights	5°C to 70°C
Temperature Range with lights	10°C to 70°C
Temperature Control	± 0.1°C
Temperature Uniformity	± 0.3°C
Relative Humidity	20 to 98% RH*
Humidity Control	± 3%
Interior Dimensions	23"W x 25.8"D x 29.8"H (58cm x 65.5cm x 75.7cm)
Exterior Dimensions	43.4"W x 30.6"D x 36"H (110cm x 77.7cm x 91.4cm)
Work Space	10 cu.ft. (283.2 liters)
Shelves	
Number of shelves	4 Stainless Steel, Wire Rod Standard
Shelf Spacing	1.5" on center (15 positions)
Shelf Size	Each Shelf: 22.8"W x 25.4"D (57.9cm x 64.5cm)
Shelf Area	4ft.^{2} each, 16ft.^{2} total
Materials / Finishes:	
Interior	Chamber - all Stainless Steel Interior door - Tempered glass
Exterior	Chamber - Cold Rolled Steel and Magnetic Stainless Steel, Powder Coat Finish
Exterior Door	Aluminum, Powder Coat Finish
Feet	Adjustable leveling pads
Electrical	115V/20A/60Hz (standard, 220V optional)
Shipping Weight	400 lbs.
Display Resolution:	
Temperature	0.1°C
Relative Humidity	1% RH

*RH levels limited by 4°C minimum dewpoint
Specifications were established at 20°C with 50% RH ambient conditions.

Chamber ambient conditions 20℃ to 25℃. Exceeding 25℃ can result in chamber failure.

For help with operation of the unit, call **Customer Service at 1-740-373-6809**.

MODEL 6030 SPECIFICATIONS

Temperature Range without lights	5°C to 70°C
Temperature Range with lights*	10°C to 70°C
Temperature Control	± 0.1°C
Temperature Uniformity	± 0.3°C
Relative Humidity*	20 to 98% RH**
Humidity Control*	± 2%
Interior Dimensions	30”W x 27.5”D x 63.5”H (76.2cm x 69.9cm x 161.3cm)
Exterior Dimensions	36”W x 39”D x 90”H (91.4cm x 99.1cm x 228.6cm)
Work Space	30 cu.Ft. (850 liters)
Shelves	
Number of shelves	5 Stainless Steel, Wire Rod Standard
Shelf Spacing	1.5” on center (37 positions)
Shelf Size	Each Shelf: 29.25”W x 26.5”D (74.3cm x 67.3cm)
Shelf Area	5.4ft.^{2} each, 26.9ft.^{2} total
Materials / Finishes:	
Interior	Stainless Steel
Exterior	Metal with powder coated finish
Feet	Adjustable leveling pads
Electrical	115V/25A/60Hz 1Ph. (standard, 220V optional)
Shipping Weight	750 lb. (340kgs)

*Optional items
**RH levels limited by 4°C minimum dewpoint

Specifications were established at 20°C with 50% RH ambient conditions.

Chamber ambient conditions 20°C to 25°C. Exceeding 25°C can result in chamber failure.

For help with operation of the unit, call **Customer Service at 1-740-373-6809**.

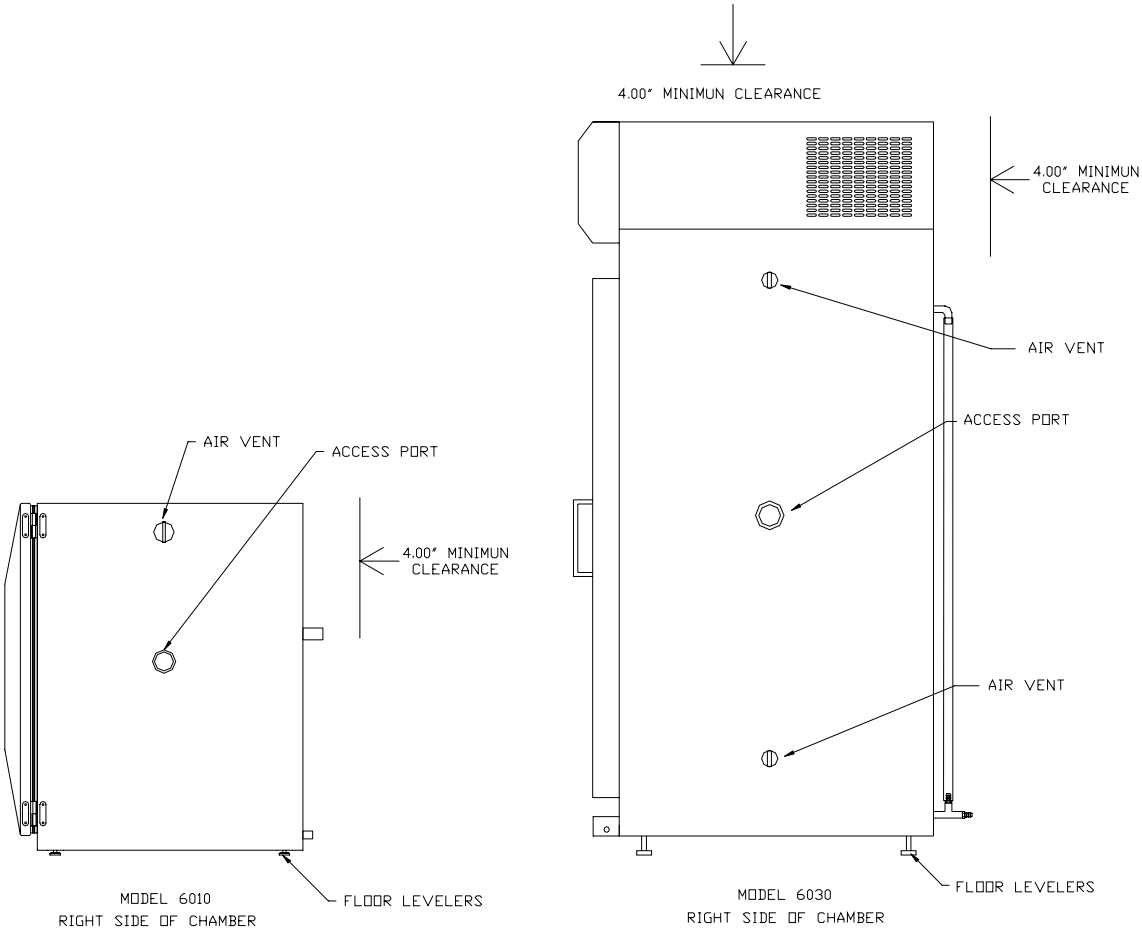
INSTALLATION

Unpacking

This product has been completely tested, cleaned and packed for shipment. Carefully remove all packing material. Please examine the chamber completely. Should any damage be found, notify the delivering carrier immediately.
Report any shortages to Customer Service at **1-740-373-6809**.

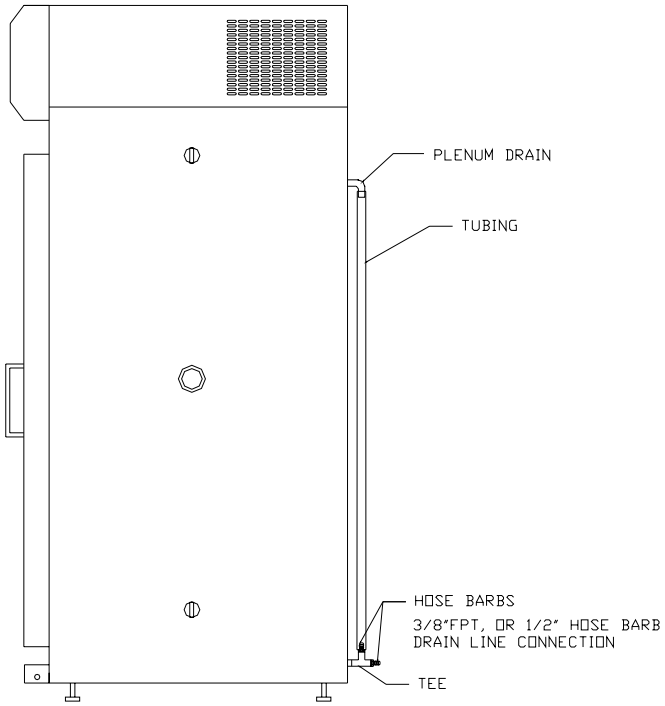
Chamber Location

Chamber ambient conditions 20℃ to 25℃. Exceeding 25℃ can result in chamber failure.
The chamber must be located in a dry, clean, and level area. Allow a 4" clearance from the back and top of the chamber for proper air circulation and ease of installation. Locate the chamber in an area out of direct sunlight and away from heating and cooling ducts. The 6010 & 6030 chambers can exhaust 2500 BTU/hr (730 W) and 4000 BTU/hr (1170 W) respectively into the surroundings. The figure below shows a side view of the chamber with air vent and access port locations.
Models 6030, 6031, 6032: Tilt the unit ½ of a level's bubble toward the back for proper water drainage
Models 6010, 6011, 6012: Unit should be completely level for proper water drainage

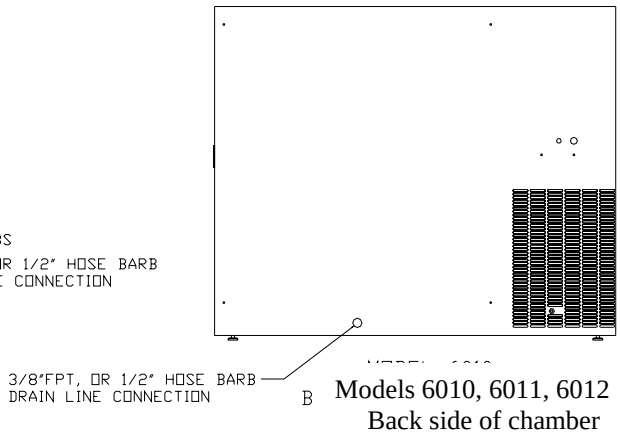


Drain connection

Connect a 3/8" NPT drain line to the drain connection located on the lower back side of the chamber. The figure below shows the drain connection on the back of the chamber. For proper operation the drain hose should not be kinked or bent. It should run down from the chamber and go into an open floor drain.



Models 6030, 6031, 6032
Right side of chamber



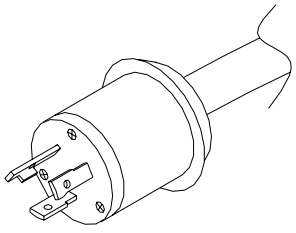
Models 6010, 6011, 6012
Back side of chamber

Power

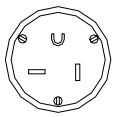
PLEASE READ CAREFULLY!

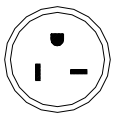
For personal safety, this chamber must be properly grounded.

The Power Cord of this chamber is equipped with a grounded plug which mates with a corresponding outlet to minimize the possibility of electrical shock from the chamber. CARON recommends that the chamber have a dedicated wall outlet.



Models 6030, 6031, 6032



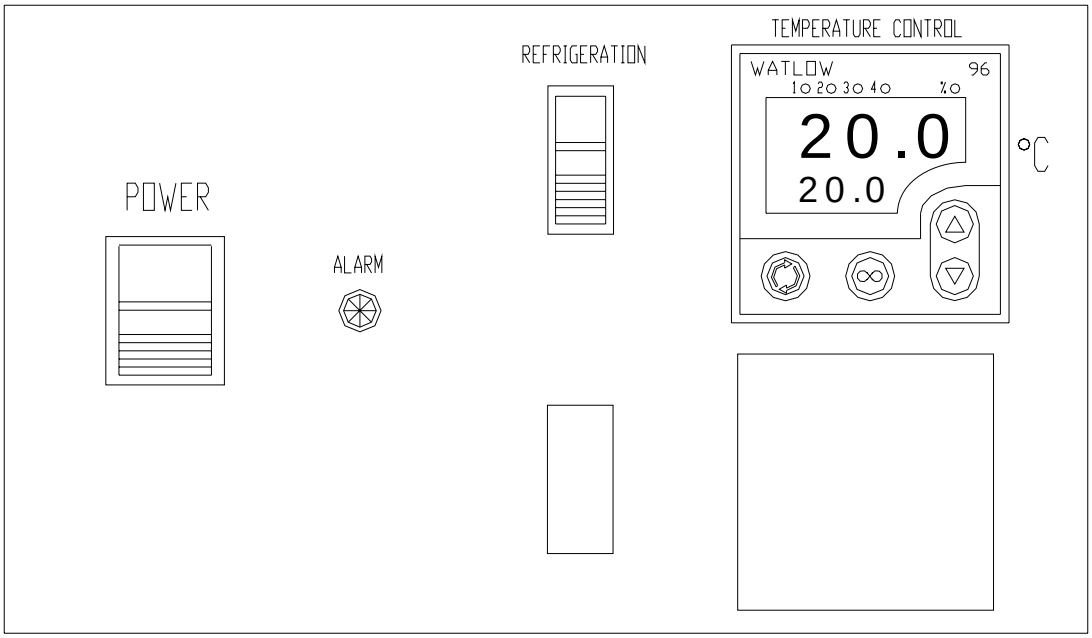


Models 6010, 6011, 6012

INSTALLATION cont.

Control System

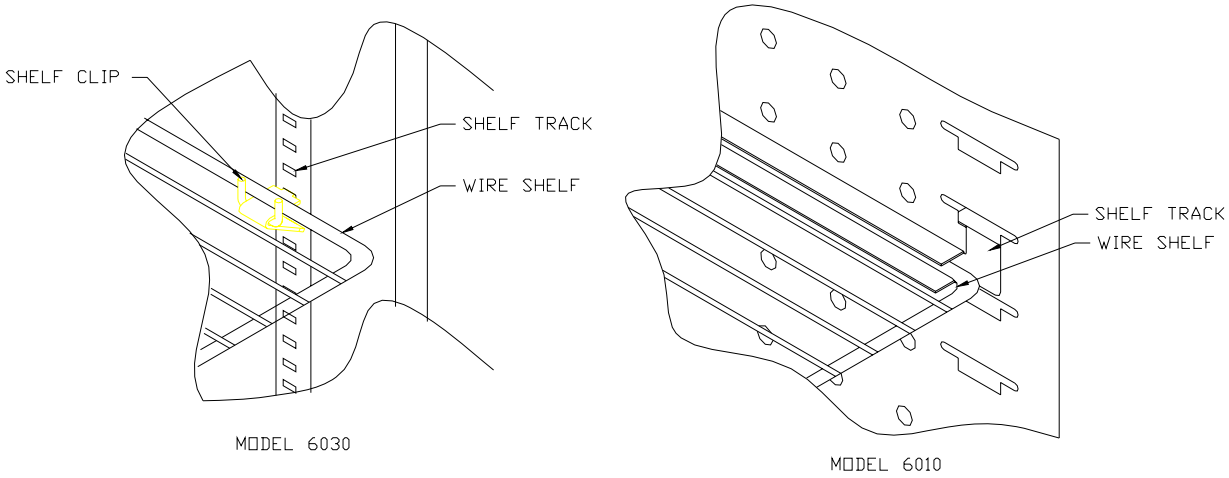
The control system is comprised of a 1/16 DIN temperature controller. The drawing below shows the control panel (exact controller may vary). The display panel consists of a power switch, refrigeration switch, and a temperature controller. The temperature controller's unit is degrees Celsius (°C). Refer to the figure below for the layout for the indicator lights as detailed below. See appendix for controller operating instructions.



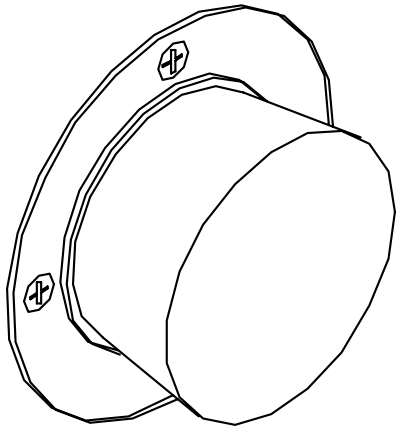
CONTROL PANEL

OPERATION

1. Connect the drain lines, and power cord as instructed in the INSTALLATION section of this manual. **(See Appendix C for additional drain connections. 6030 only)**
2. Insert all shelf clips, and shelves. Check to see if they are properly installed.



3. Close the chamber door.
4. Install rubber stopper in access port on right side of cabinet.



5. Turn on power switch located on the control panel. This switch activates the heating unit and temperature controller. The temperature controller will sound an alarm. The temperature alarm will automatically reset after a few seconds.
6. *Turn on the refrigeration switch when operating at setpoints below 35°C. This switch activates the refrigeration system.
7. Set the temperature controller to the desired setpoint. (See appendix if necessary).

8. Turn on the humidity switch. This switch activates the humidity system and the humidity controller. (with humidity option only). Set the humidity controller to the desired setpoint. (See appendix if necessary).

During normal refrigeration operation, a soft “clicking” sound can be heard. This sound is the result of the solenoid control valves switching in the refrigeration system.

Chamber Loading

Air circulates through the chamber to maintain uniform conditions. When loading (putting product into) the chamber, position samples so air can flow freely throughout the chamber. For best temperature & humidity uniformity, keep samples away from surfaces as listed in table below. Do not put product on the floor.

Model	Ceiling	Back wall	Side walls	Front / door	Between shelves
6010, 6011, 6012	2 in (5 cm)	2 in (5 cm)	4.5 in (11 cm)	2 in (5 cm)	2 in (5 cm)
6030, 6031, 6032	6 in (15 cm)	6 in (15 cm)	3.5 in (9 cm)	3.5 in (9 cm)	3.5 in (9 cm)

CONTROLLERS

The temperature control system is comprised of a single channel, dual output controller. On/off outputs are used to drive heaters and cooling solenoids. An additional controller is used to control the humidity (if that option is ordered). Both controllers are configured and tested at the factory to ensure proper performance.

Controller operating procedures and factory default settings are listed in the Appendix. Default is temperature display in ºC. For ºF, consult factory for details. In addition, see the separate controller manual for more details on controller operation, menus and available settings.

Due to individual circumstances, it maybe beneficial to modify the default settings to best suit an applications. Examples include alarm and communication settings.

NOTE: On power up, the temperature and humidity controllers allow the system one minute to stabilize prior to turning on outputs. Therefore it is normal for the unit not to turn on heating or cooling, or humidify for a full minute on power up regardless of set-points and cabinet conditions.

TEMPERATURE DEVIATION ALARM

All units are equipped with an alarm system that constantly monitors temperature to ensure the user is notified if the cabinet goes into an alarm condition. Notification occurs via a RED indicator LED and an audible alarm. Temperature alarms will occur once the alarm condition has been present for 15 minutes. This delay is in place to avoid nuisance alarms associated with door openings.

Example of Deviation value:
Set point = 30°C
Alarm high = 5°C
Alarm low = 3°C
∴ High Alarm = 35°C and Low Alarm = 27°C

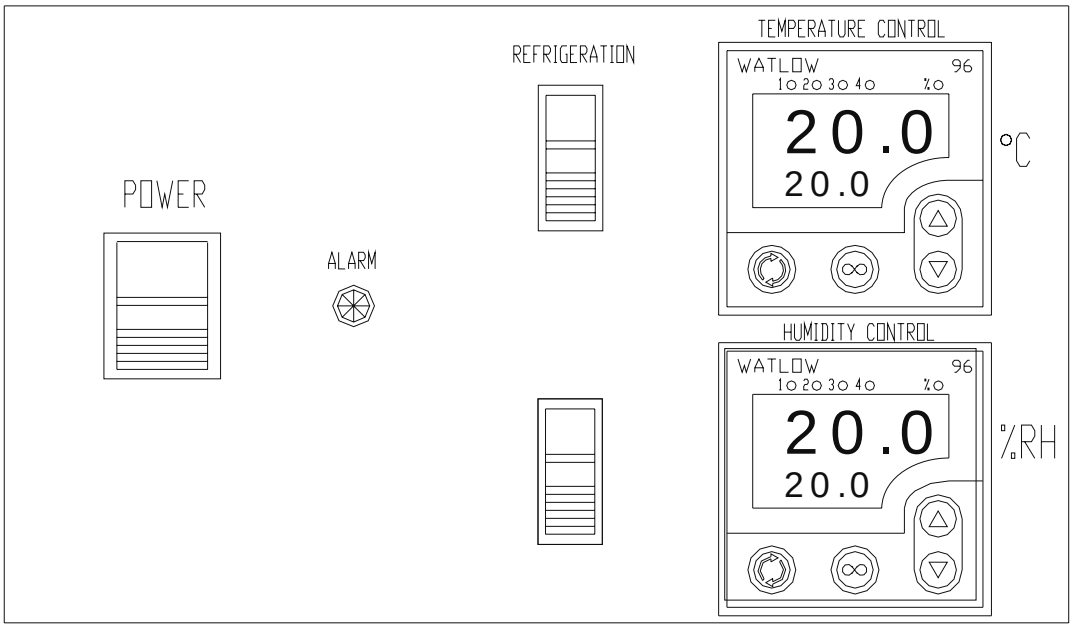
NOTE: When powering up the chamber, if the actual interior chamber temperature varies from the setpoint, immediately set the deviation amount to a large enough margin in order to allow the chamber to reach the temperature setpoint. If the deviation amount is too small the alarm will sound until the chamber is within the min / max deviation range. The temperature deviation alarm is preset to 50°C above or below set point.

6010 & 6030

Humidity System
A bi-modal humidification system allows for independent humidification and dehumidification. This design provides control over both the humidity injection system and the dehumidification system. This system permits the chamber to respond faster as well as controlling the chamber more efficiently at a constant relative humidity.

The Humidity Injection System utilizes atomizers to inject moisture into the chamber to achieve humidity levels of 98% RH. An extended low end humidity level of 20% RH is attainable due to the configuration of the refrigeration system (limited by a minimum 4°C dew point). The atomizer system is preferred over the boiler type system, since it will not add heat to the chamber. The added heat causes the system to work harder to maintain temperatures, especially at lower levels.

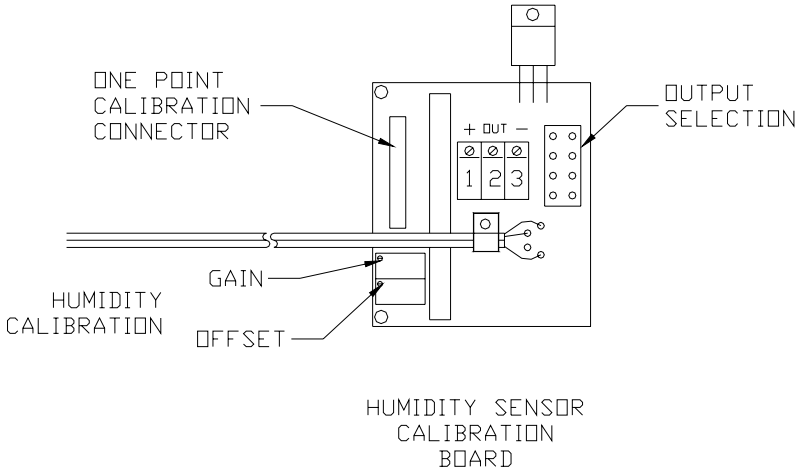
Humidity System Controls
The humidity system is comprised of a 1/16 DIN controller. The illustration below shows the layout of the control panel (controller model may vary). The display panel consists of the standard control panel, in addition a humidity switch, and a relative humidity controller. The relative humidity controller's unit is %RH. Refer to the appendix for controller details.



CONTROL PANEL WITH
HUMIDTY OPTION

Humidity (Chromalox) Controller Calibration (for Watlow controllers, see Appendix A)

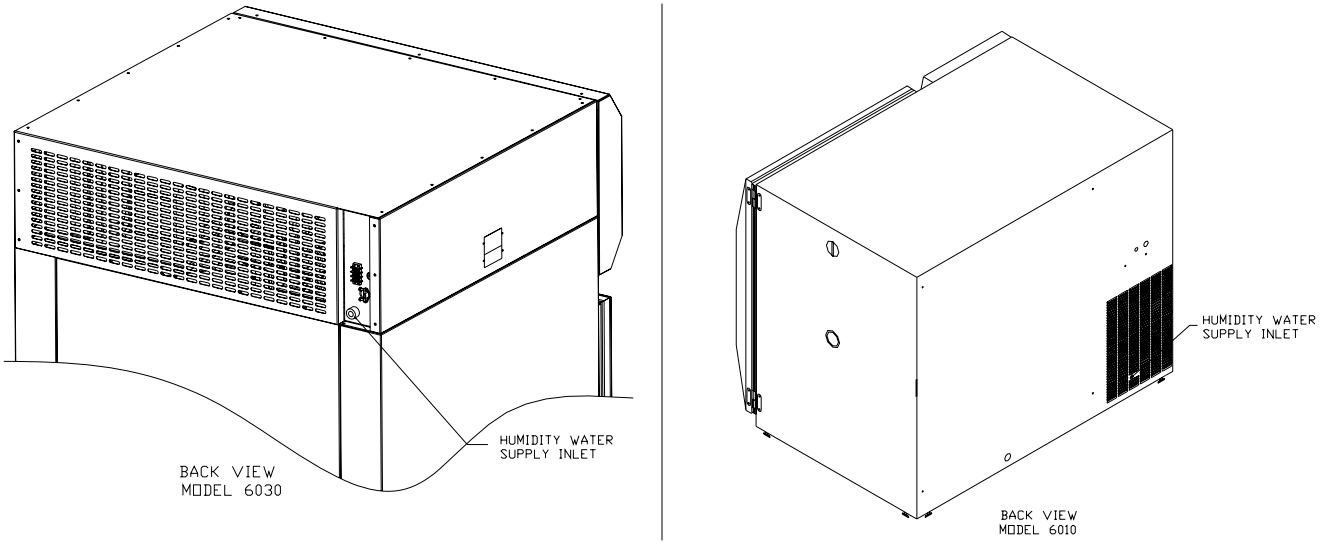
1. Remove the access panel (control panel cover 6030), (right side panel 6010).
2. Find the 2" x 3" black utility box located adjacent to the wiring and in the service area. (Behind fuse panel 6030, near ceiling 6010).
3. Inside the utility box is the humidity module.
4. Slowly adjust the BOTTOM humidity calibration pot to the desired calibration point as shown on the humidity controller readout.



Humidity Water Inlet

Model 6030: Facing the back is a water connection in the upper right hand corner. The ¼" FPT fitting is attached to a filter/strainer and pressure regulator that is set at 40 PSI. Any type of ¼ MPT fitting can be used to connect to water supply.

Model 6010: Facing the back is a water connection in the lower right hand corner. The ¼ FPT fitting is attached to a filter/strainer and pressure regulator that is set at 40 PSI. Any type of ¼ MPT fitting can be used to connect to water supply.



NOTE

Use only distilled or deionized water with resistivity between 50kΩ-cm & 1 MΩ-cm and pH above 6.5. Using water outside this range will void the warranty.

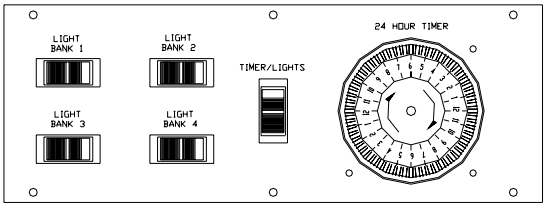
Do not use water with chloramines. Chloramines can damage internal rubber gaskets and cause a catastrophic leak.

Model 6030:The two atomizing heads are located in the interior ceiling area which inject the humidity into the chamber.
Model 6010: The atomizing head is located on the left side interior wall.
It is also important to check and clean the humidity water inlet filter/strainer every 6 months. After cleaning filter/strainer hand tighten bowl onto housing, overtightening bowl can cause cracks and filter/strainer to leak

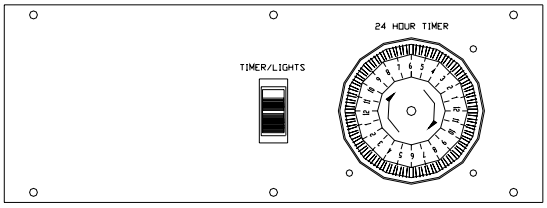
DIURNAL LIGHTING SYSTEM

The Diurnal Lighting System, also known as the Dual Setpoint/Light Cycle Timer System
Model 6032 consists of four (4) light banks, with 2 lights per bank; one light bank per shelf on 4 of the five shelves, and a timer.
Model 6012 consists of two (2) light banks, with 1 light per bank; one light bank per shelf on 2 of the four shelves, and a timer.
This system allows the operator to simulate Day/Night testing. The Switch will turn both light banks on and off simultaneously as well as operate the two setpoint temperature system. The illustration below is a layout of the control panel.

Note: For units equipped with ramping controllers, the timer maybe used to trigger certain events but does not necessarily switch between two set points. See controller manual for details.



DUAL SETPOINT/LIGHT CYCLE TIMER PANEL
MODEL 6030



DUAL SETPOINT/LIGHT CYCLE TIMER PANEL
MODEL 6010

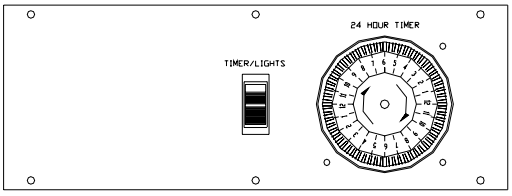
During operation of the Diurnal Lighting System a second setpoint can be set in both the temperature and humidity controllers. This second setpoint will be used as the DAY setpoint, or when the lights are on. See appendix for procedures to set the second setpoints for the temperature and humidity controllers.
Note: When Timer/Lights switch is in "off" position the Temperature, Humidity Controllers will default back to original setpoints SP.

TIMER
The circular timer on the lower control panel shown above is for the operation of the dual setpoint/light cycle system. The timer is adjustable at 15 minute intervals by depressing the cams found on the outer ring of the timer.

SETTING THE TIMER:

a) The Timer is located on the control panel as shown in the previous illustration.
b) Depress the number of cams toward the timer's center to fit the duration of your program.
c) Set the timer dial to reflect an entire day.
d) Turn on the Switch

LED STRIP LIGHTING
Chambers with optional LED strip lighting include a 24-hour light cycle timer. Can use with ramping controllers but not second set point.



HEATLESS DRYER PACKAGE
The Heatless Dryer Package is designed to extend the operational limits of CARON's Series 6000 Environmental Test Chamber to its minimum humidity control point of 2% RH and improve the dehumidification rate of the chamber. This is accomplished by "purging" the chamber of its moist air. The Dryer Package utilizes 90 to 100 PSI compressed air to operate.

A coalescent filter (with automatic drain) will remove small amounts of incoming moisture. However, particles of dirt or rust, as well as large amounts of condensed moisture or oil that may be in the compressed air line feeding the dryer must be removed from the air stream before it enters the dryer.

CARON recommends installing a pressure gauge prior to the dryer to air in monitoring system pressures. The flow meter shows the flow rate of dry air entering the chamber. It is adjustable by the knob at the bottom of the meter. Maximum performance is obtained at 300 SCFH (or 5 CFM). Operating the unit above this purge rate may *decrease* performance!!

On some models, a pressure regulator is installed between the tower dryers and glass flow meter to limit the pressure into the flow meter. The regulator should be set at a maximum of 100psi.

DRYER PACKAGE INSTALLATION

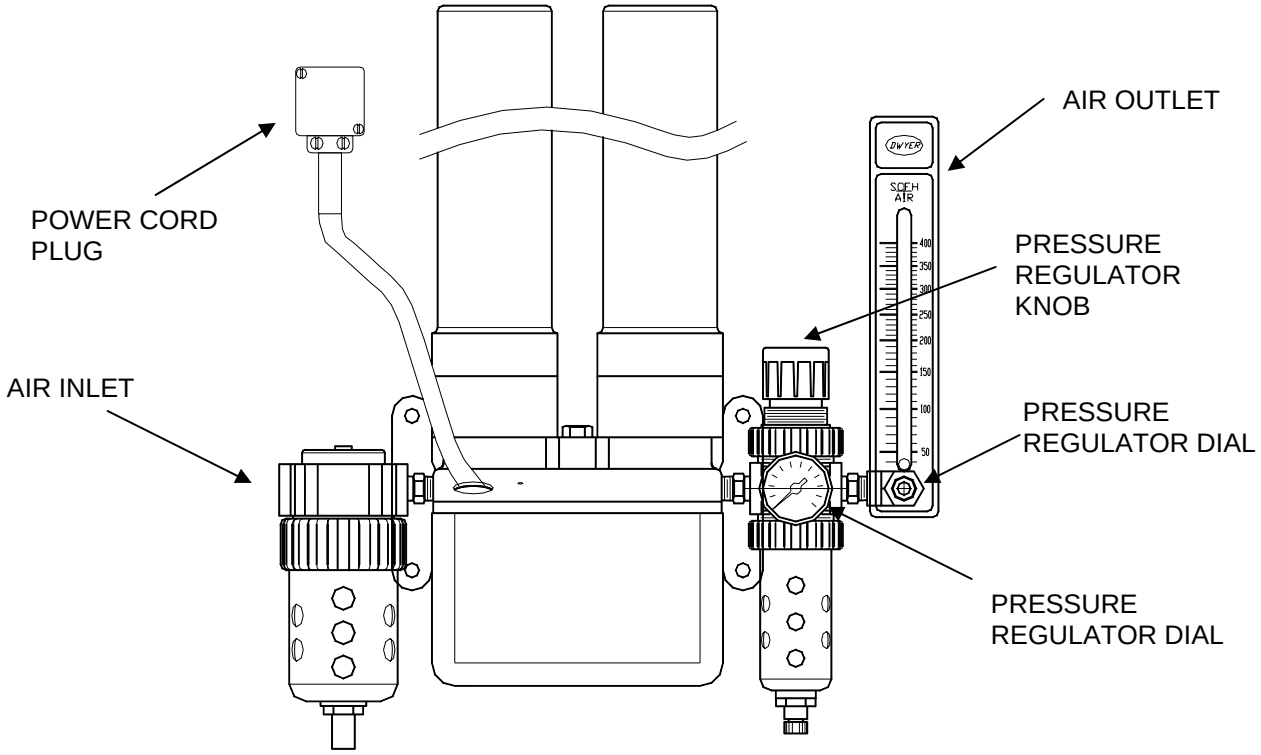
a) Attach the Dryer package to the exterior chamber with the pre-drilled mounting holes and mounting hardware. Be sure to secure each tower.

b) Attach the 3/8” ID clear tubing to the outlet of the flow meter. Secure tubing with the hose clamp provided.

c) Connect compressed air (either from house air or other compressed air source) to the fitting labeled “air supply inlet”.

NOTE: THE AIR SOURCE MUST BE OIL-FREE AND WATER-FREE AND FILTERED TO 10 MICRONS MINIMUM.

d) Plug in the air regulating solenoid line cord into the matching receptacle located above the dryer mounting bracket.



TESTING AND ADJUSTMENTS

Connect the cord to the proper receptacle as mentioned above, and turn the humidity power switch “on”.

Turn on air supply. Be certain that the air pressure into the inlet side of the dryer assembly is set at a minimum of 90 PSI and not above a maximum of 100 PSI.

To set the pressure regulator

1. Close the air flow adjustment knob
2. Set the chamber to 0% humidity (full dehumidification)
3. Adjust the pressure regulator adjustment knob to 90 psi

To set the air flow rate

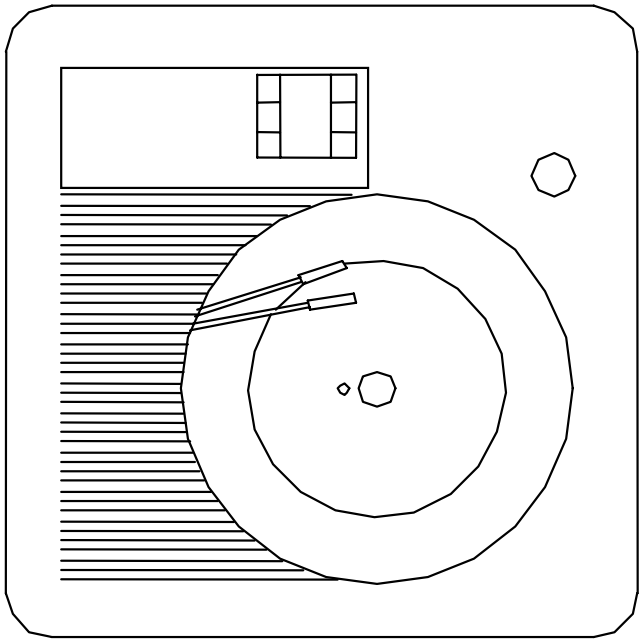
1. Set the flow meter on the dryer assembly to approximately 300 SCFH. Watch the humidity display to see that the % RH is moving down to the specified setpoint.

Allow sufficient time for the chamber to stabilize when setting up and making adjustments, especially if the chamber has been running with high humidity levels. Running the chamber at higher than ambient humidity levels can cause moisture to collect in all areas of the chamber including sensors and other components. This moisture must be removed before actual tests can proceed at accurate, lower than ambient humidity levels.

CIRCULAR CHART RECORDER,

The Honeywell DR 4300 General Purpose Circular Chart Recorder uses reliable microprocessor operation to generate dependable pen drawn analog traces on preprinted 10-inch (250 mm) charts.

The two-pen model (**RCDR103)** accepts inputs from a temperature sensor and a humidity sensor.

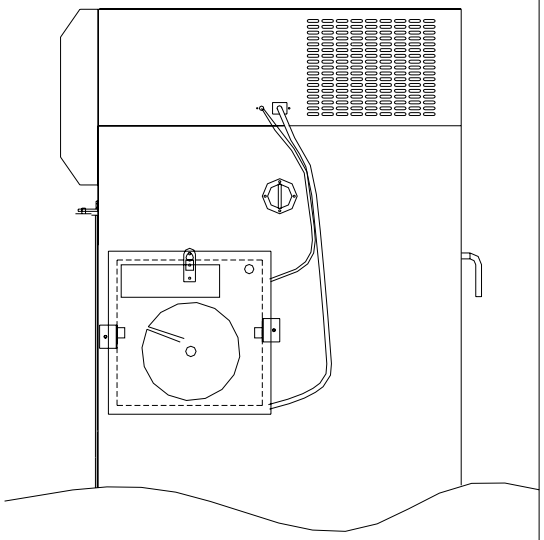


The single-pen model **RCDR107** records temperature only.

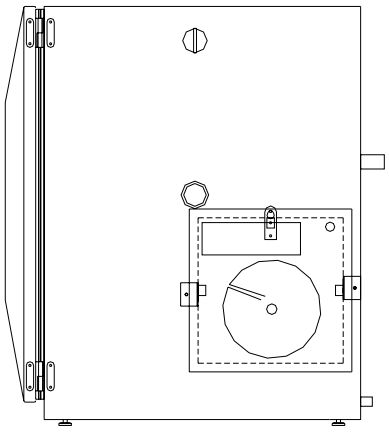
temperature sensor is a highly accurate RTD. The humidity sensor is a Vaisala or equal which utilizes the Humicap® sensor to measure relative humidity. The recorder uses disposable fiber-tip ink cartridges for dependable recording with minimum maintenance. The recorders are housed in a molded case with a glass windowed, gray gasketed door which protects internal components while allowing easy access to the chart.

Input samples are taken at a rate of 2 times every 1.3 seconds. Each sample is amplified and then converted to a digital signal which is isolated and passed to the microprocessor. Analog and digital filters with fixed time constraints provide input signal smoothing as required. Standard factory set up for chart speed is 7 day operation. Refer to the Chart Recorder's User's Manual to change the chart speed settings for various chart speeds.

Mount the recorder by using the already installed bracket.
There are three factory drilled holes located on the right side of chamber facing the front of chamber.
Using the factory supplied screws, screw the recorder to the side of the chamber.



Model 6030, 6031, 6032
Right side



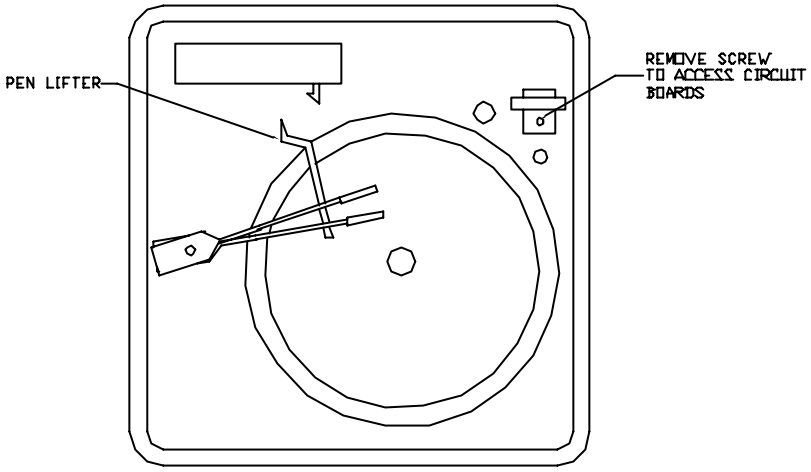
Model 6010, 6011, 6012
Right side

NOTE: Before applying power to the recorder, complete these preliminary preparation tasks to prepare the recorder for operation.

NEVER ATTEMPT TO ACCESS COMPONENTS INSIDE THE RECORDER CASE WITH POWER APPLIED.

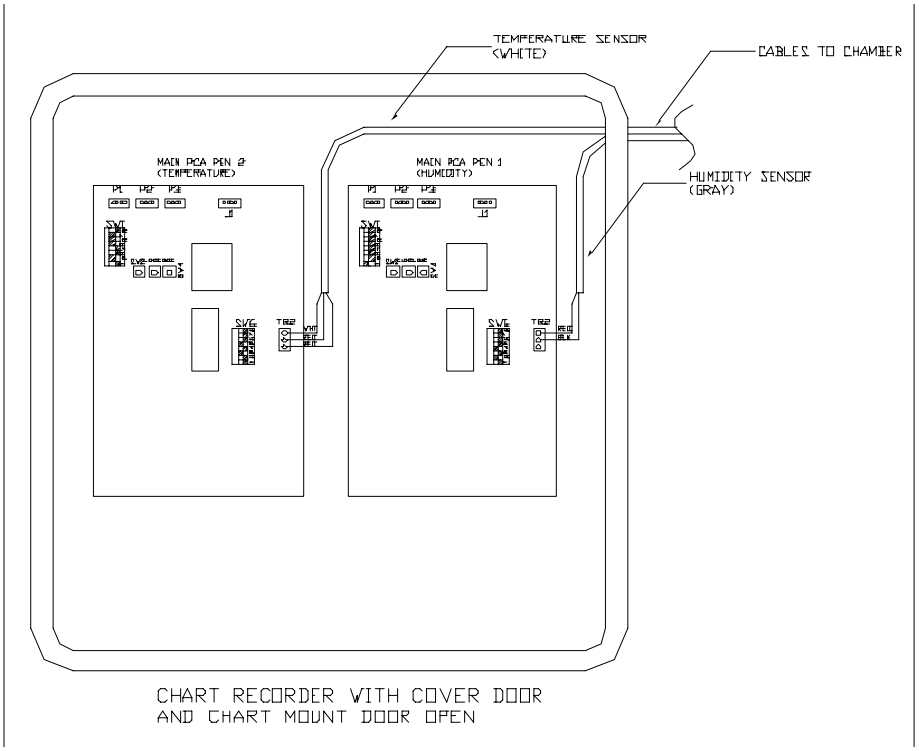
The Vaisala RH Sensor is wired to the Humidity controller in the chamber for 0-5 Volt actuation.
An individual 100Ω RTD Temperature sensor is wired to the Recorder.
In order to connect the Humidity and temperature sensor to the recorder, refer to the figures below to perform the following procedures:

a) Locate the wires fastened to the side of the chamber, these are the temperature and humidity sensor wires.
b) Push the button on the recorder door and swing the door open.
c) Loosen the captive screw in the chart plate and swing the plate out.



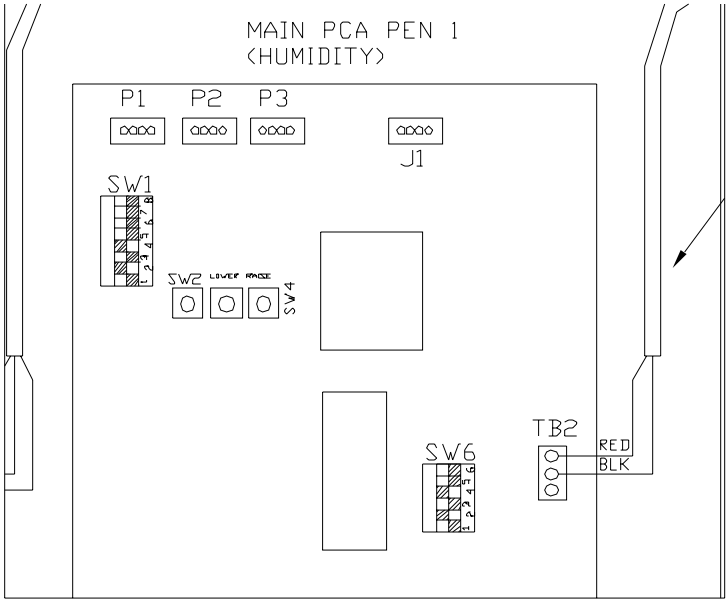
Run the sensor wires into the chart recorder through the knock out hole on the recorder.

d) There are two modules inside the recorder, the one on the right is for humidity (Pen 1), and the left one is for temperature (Pen 2).

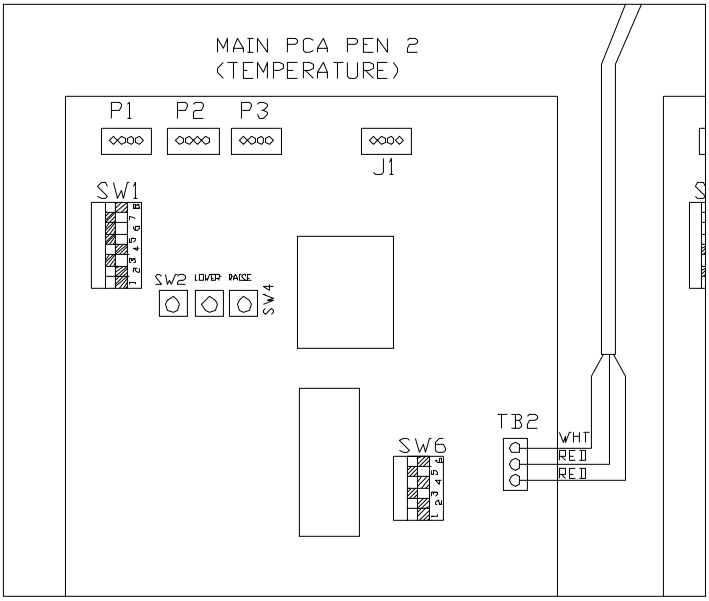


e) To connect the humidity sensor, Locate terminal block TB2 on the middle right side of the Main printed circuit board for Pen 1.

f) Insert connector with the red and black wires from the humidity sensor to the connector labeled red and black.



g) Insert connector with the white, red and red wires from the temperature sensor to the connector labeled white, red and red.



h) Close the chart plate and replace the captive screw.

Pull up on the pen lifter to raise the pens from the chart plate and remove the protective cap from the pen tip.

NOTE: DO NOT LIFT THE PENS DIRECTLY.

(j) Slip the new chart under the pen lifter, pen and time index, and press the chart into place over the chart hub and locating pin.
(k) Grasp the chart hub and locating pin and turn the chart until the desired time line on the chart is aligned with the time index on the chart plate and Pen #1. Push down the pen lifter to return the pens to the chart.
(l) Close the recorder door and apply power. The recorder pen will start tracking the input value, after pen initialization.

ROUTINE MAINTENANCE

The recorder does not require any periodic maintenance. However, the chart and ink cartridges will have to be replaced as required. The chart paper and ink cartridges can be ordered directly from Honeywell (USA & CANADA)

Replacement Pen #1 Purple (six pack)	PN# 30735489-007
Replacement Pen #2 Red (six pack)	PN# 30735489-002
Replacement 10” Chart Paper (25 charts)	PN# 30755820-001

Replacing the Ink Cartridge:

Refer to Figure 8 in the Honeywell manual: Replacing the Ink Cartridge and Chart.

1. Remove power from recorder. Push in the button on the door and swing the door open.
2. Pull up on the pen lifter to raise the pens from the chart plate.

NOTE: DO NOT LIFT THE PENS DIRECTLY

CAUTION: Be careful not to move the pen arm while removing and installing the ink cartridge.
Note:The longer pen arm is pen #1

3. Unclip and remove the purple (Pen #1) or red (Pen #2) ink cartridge for the pen arm.
4. Remove the protective cap from the pen tip on the new cartridge and open its clip.
5. Slide the new cartridge onto the pen arm so that its tip fits into the notch at the end of the pen arm and close the clip to secure the cartridge to the pen arm.
6. Push down the pen lifter to return the pen tip to the chart.
7. Close the door and apply power.

Replacing the chart:

Refer to Figure 8 in the Honeywell manual: Replacing the Ink Cartridge and Chart.

1. Remove power from recorder. Push in the button on the door and swing the door open.
2. Pull up on the pen lifter to raise the pens from the chart plate.

NOTE: DO NOT LIFT THE PENS DIRECTLY

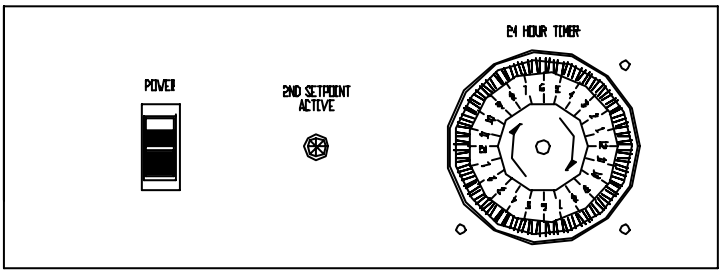
3. Lift the chart from the hub and locating pin and slide it from under the pens to remove it from the chart plate.
4. Slip the new chart under the pen lifter, pens and time index; and press the chart into place over the chart hub and locating pin.
5. Grasp the chart hub and locating pin and turn the chart until the desired time line on the chart is aligned with the time index on the chart plate and Pen #1. Push down the lifter to return the pens to the chart.
6. Close the door and apply power.

Reference: Honeywell DR4300 Circular Chart Recorder GP Model Product Manual

CONTACT CLOSURE SYSTEM - CNTC101

The **CONTACT CLOSURE SYSTEM** is a dual setpoint cycle system which consists of a timer that allows the operator to have the chamber switch between two setpoints.

In order to operate the Dual Setpoint Cycle System a second setpoint should be set in both the temperature and humidity controllers. See appendix for instruction to set the second setpoints for



CONTACT CLOSURE CONTROL PANEL

the temperature and humidity controllers.

Note: When 2nd Setpoint switch is in "off" position the Temperature, Humidity Controllers will default back to original setpoints SP.

Note: For units equipped with ramping controllers, the timer maybe used to trigger certain events but does not necessarily switch between two set points. See controller manual for details.

TIMER

The circular timer on the lower control panel is for the operation of the dual setpoint cycle system. The timer is adjustable at 15 minute intervals by depressing the cams found on the outer ring of the timer.

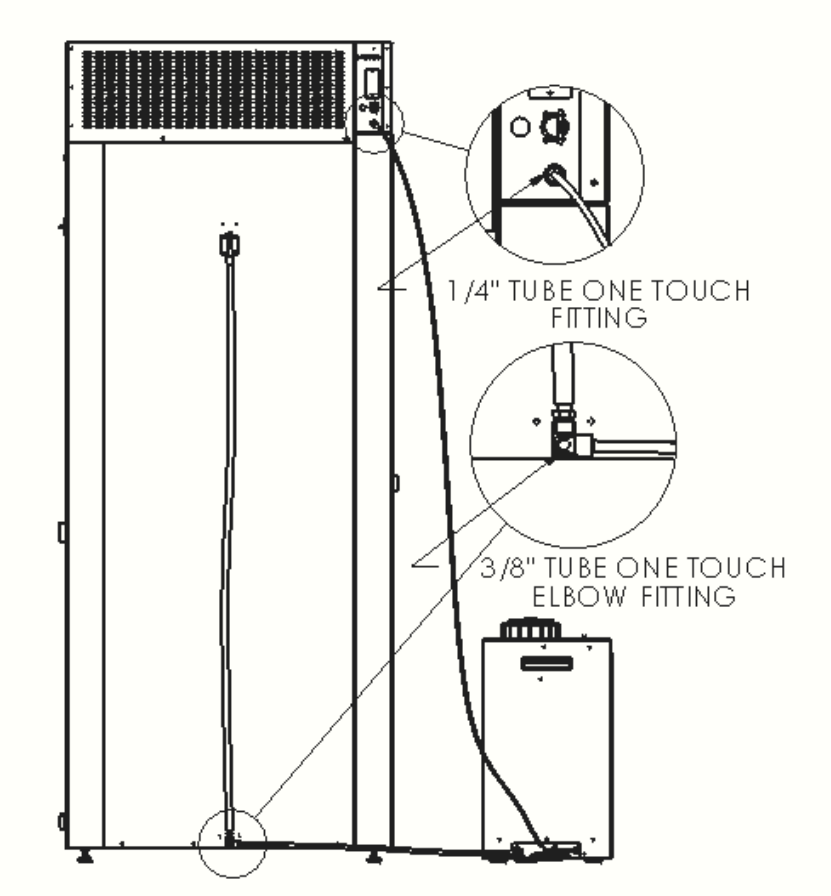
SETTING THE TIMER:

a) Timer is located on the Control Panel. Depress the number of cams toward the timer's center to fit duration of your program.
b) Set the timer dial to reflect an entire day.
c) Turn on the Switch marked Setpoint #2.

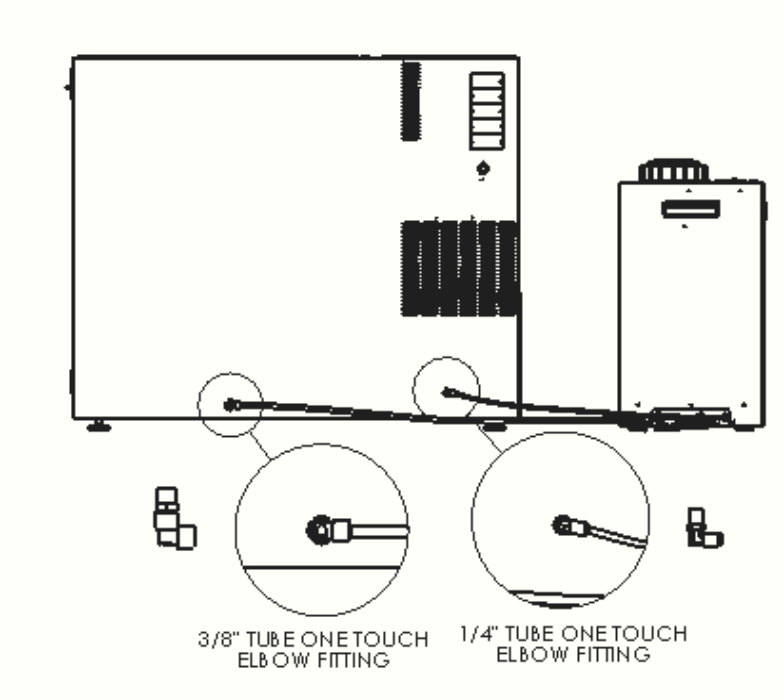
When the chamber is in the Second Setpoint Mode, the light will indicate Setpoint 2 Active. Also on both the Temperature and Humidity Controller an indicator light in the lower right hand side of the controllers will flash on SP2, and the second setpoint will be displayed on the controllers.

CONDENSATE RECIRCULATING SYSTEM: CRSY102

The Condensate Recirculating System is used in conjunction with CARON's Series 6000 Test Chambers, as a water delivery system. This system is typically used in facilities where a floor drain or in-house source of distilled or deionized water are not available. The system provides continuous, clean, filtered water to the chamber's humidity injection system, collects and recycles the condensate that forms in the base of the chamber. Refer to instructions with the CRSY102 for connection details. Use fittings provided with 6030/6010 to connect to CRSY102.



Model 6030, Back view with CRSY102



Model 6010, Back view with CRSY102

REMOTE ALARM CONTACT: ALRM202

CARON'S accessory option, ALM-202, is a remote alarm contact for connection to an external alarm or dialing system, to signal a temperature or humidity deviation from control safety settings.

The terminal block located on the back of the unit has both N/O and N/C contacts. In the event of an alarm condition signaled by either the temperature or humidity controller, the N/O contract will 'close' and the N/C contact will 'open'. Once the alarm condition is cleared, the contacts return to their normal conditions. The diagram below shows the operating conditions for both connections:

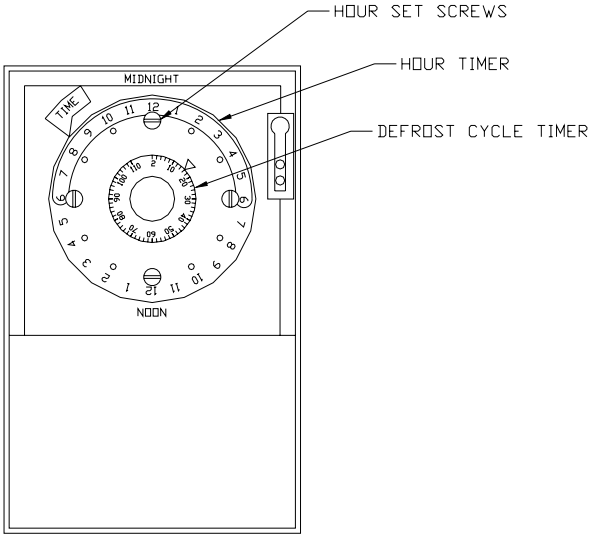
Terminal Connection	Unit off	Normal	Alarm
N/O to C	Closed	Open	Closed
N/C to C	Open	Close	Open

COMPUTER COMMUNICATIONS OPTION - SFTW102

The temperature and humidity controllers are equipped with RS-485 computer communications for remote control or data logging. It is the customer's responsibility to provide an RS-485 communications board or RS-485 to RS-232 converter for their PC and set up the system to accept data from the controllers. CARON can provide information about the type of RS-485 board and/or converter for your system. Terminations 11(R/T -), 12 (R/T +) and 13 (GND) located on the back of the chamber are used to connect for communications.

DEFROST PACKAGE – DEFR201

The optional defrost timer allows the chamber to operate at low temperatures down to 0°C. When operating the chamber with this option, it is recommended to utilize the defrost system to prevent ice build-up on the condensing coil. The defrost time is pre-set to provide four defrost cycles every 24 hours (once every 6 hours) with the defrost duration at 16 minutes. While the unit is in the defrost mode, the temperature may drift up a couple degrees. To adjust timer settings remove top cover of unit. Timer located in front right hand corner of unit.



FACTORY SETTINGS
EVERY 6 HOURS
FOR 16 MIN CYCLE

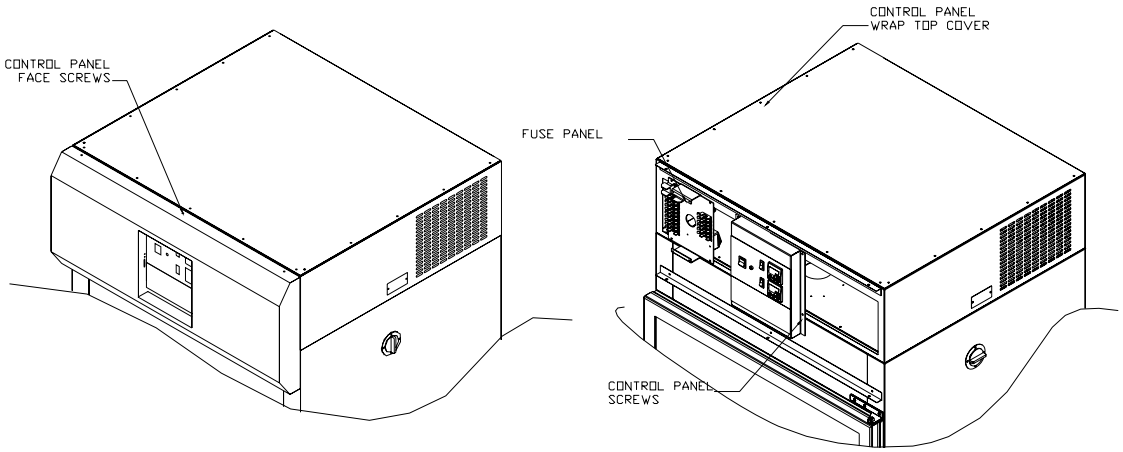
MAINTENANCE

CONTROL PANEL ACCESS MODEL 6030, 6031, 6032

WARNING: Before removing control panel, disconnect all power!

The access to all control panel and top mounted electrical parts, refrigeration parts as follows:

a) The control panel components can be easily accessed by removing the (6) screws located at the top, and bottom of the control housing cover.
b) Pull the front mounted control housing cover towards you to access the control panel.

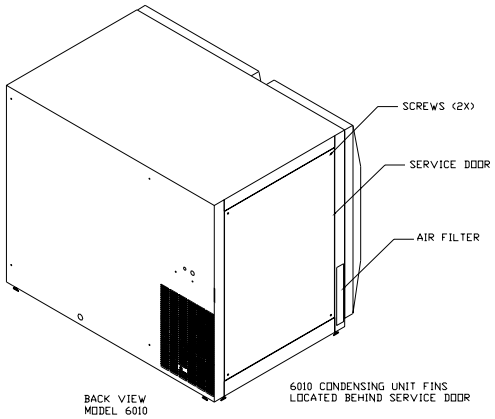


c) Next remove the (4) screws that hold the control panel housing in place, and the housing will be loose.
d) In order to access the electrical and refrigeration components, remove the sheet metal screws that are holding the top cover in position.

CONTROL PANEL ACCESS MODEL 6010, 6011, 6012

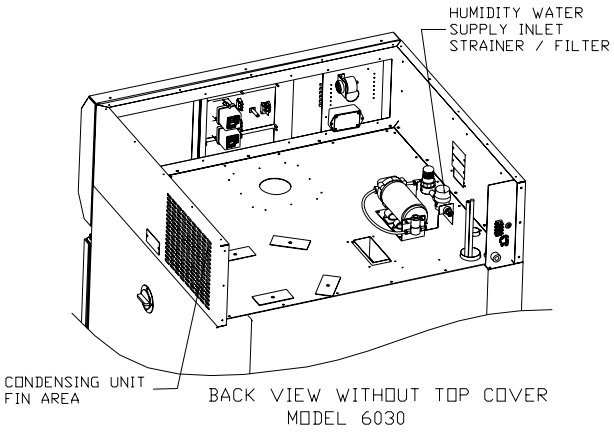
WARNING: Before removing control panel, disconnect all power!

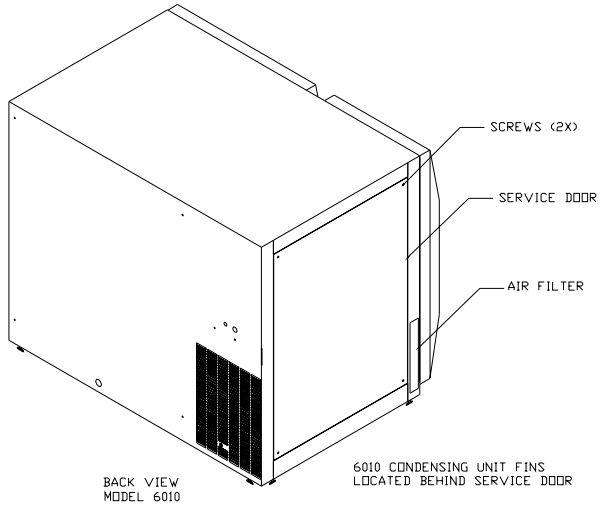
To access all control panel, electrical parts, and refrigeration parts this can be done by removing the (2) screws located at the top of the service panel, and pulling the panel out of it's slot.



CHAMBER MAINTENANCE SCHEDULE

a) Vacuum or blow out condensing unit fins. (Monthly)
b) Clean out water filter for humidity water inlet. (Monthly)
c) Check drains in floor, rear cabinet and drip trough for blockage. (Monthly)
d) Using a level, check to maintain ½ of a bubble tilt to the back of the chamber for proper water drainage. (Every 6 Months) (Model 6030 only)
e) Clean the interior chamber stainless steel with a non abrasive cleaner or glass cleaner.
f) Check air filter (Model 6010, 6011, 6012), replacement filters can be ordered through Caron Service Dept. 740-373-6809. (Monthly)
g) Check condensate drip pan located inside of 6010, 6011, 6012 (Every 3 Months), remove service door, lower right hand corner





TROUBLESHOOTING GUIDE

PROBLEM: No power, main power switch light not energized
POSSIBLE CAUSES:

1. Power lines not wired properly into grounded wall outlet
2. Main fuse blown
3. Customer power defective

PROBLEM: Cabinet not heating, safeties not energized
POSSIBLE CAUSES:

1. Heater fuse blown
2. Snap disc open
3. Thermal fuse open
4. Main temperature control and/or sensor defective
5. Controller not programmed properly
6. Poor air circulation within the chamber
7. Solid State Relay Defective

PROBLEM: Cabinet not cooling, over-temp safety energized
POSSIBLE CAUSES:

1. Compressor switch is not on
2. Compressor is hot, trip out on thermal overload
3. Poor internal air circulation
4. Heat is remaining on

PROBLEM: Inconsistent temperature control and then over-temp safety energizes
POSSIBLE CAUSES:

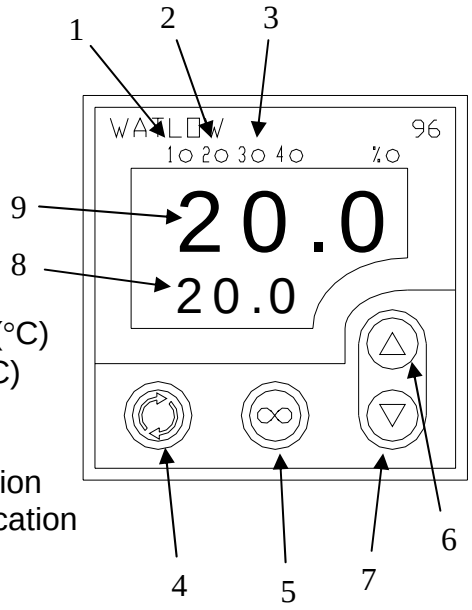
1. Circulation fan defective
2. Temperature sensors out of position or defective
3. Controller not programmed properly

For further troubleshooting procedures, refer to the individual manuals for the controllers, recorder, or contact CARON at **740-373-6809**.

APPENDIX A - WATLOW® 96 CONTROLLER

This appendix describes the operating instructions and default controller the Watlow 96 temperature & humidity controllers. A 96 controller can be identified by either an “96” in the upper right corner or with an upper green/lower green led display.

Controller Layout



Temperature

1 - Output 1, indicates heating system
2 - Output 2, indicates cooling system
3 - Output 3, indicates temperature alarm
4 - “Advance” key
5 - “Infinity/Home” key
6 - “Up” key
7 - “Down” key
8 - Lower display, Setpoint Temperature (°C)
9 - Upper display, Actual Temperature (°C)

Humidity

1 - Output 1, indicates system humidification
2 - Output 2, indicates system dehumidification
3 - Output 3, Not used
4 - “Advance” key
5 - “Infinity/Home” key
6 - “Up” key
7 - “Down” key
8 - Lower display (green), Setpoint Relative Humidity (%RH)
9 - Upper display (green), Actual Relative Humidity (%RH)

The Output indicator lights on the controller are not continuously on. They are only on when the specific system is in operation.

Change Set Point

Use the up and down arrow push-buttons to obtain the desired setpoint temperature or humidity.

Customer Menu (access by pressing “advance button”)

Alarm 3 Low	A3LO	
Alarm 3 High	A3hi	
Alarm Hysteresis 3	AhY3	
Calibration Offset	CAL 1	
Event Set Point	E Sp	(2nd set-point, and diurnal light option)

Controller Calibration / Offset

The following procedure outlines the steps for setting a temperature or humidity offset.

A. Press the advance key until CAL1 is in the lower display
B. Press the up or down keys to obtain the desired temperature or humidity offset
C. Press the Infinity key to return to the home page

Controller Parameters

Controller parameters are factory set and should not be changed. Incorrect controller parameters will result in poor performance and are not covered under warrantee. If parameter re-setting to factory default values is needed, consult CARON service.

Diural Lighting & Contact Closure System

With the diural lighting and contact closure systems, different temperature and humidity set points maybe selected for lights ‘on’ and ‘lights ‘off’. To set the second set point:

A. Press the up and down keys together for 3 seconds
B. Press the advance key until SP2 is in the lower display
C. Press the up or down keys to obtain the desired temperature or humidity set point
D. Press the Infinity key to return to the home page

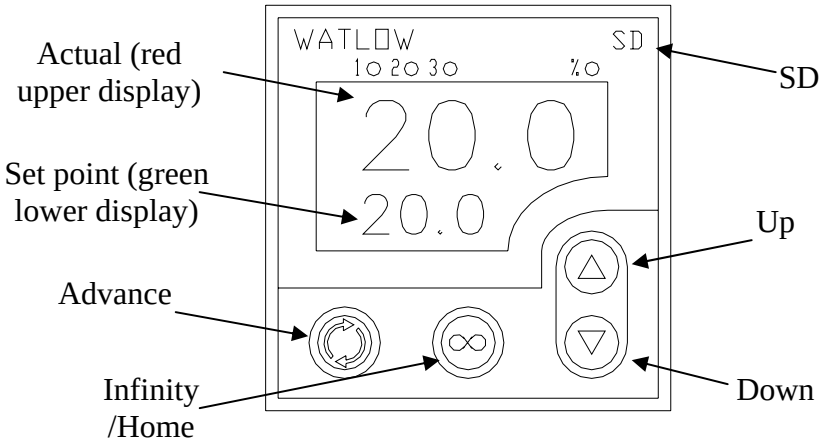
The original setpoints “SP” are the NIGHT, when the lights are off, temperature and humidity setpoint settings.

Communications

Optional Anafaze® Watview Run-Time computer communications software using RS-485 computer communications is available for use with the standard controls and is very user friendly software. The software can be used for real time operation, set-up, and data logging. Please consult the Watview help files in the software for operating instructions.

APPENDIX B - WATLOW® SD CONTROLLER

This appendix describes the operating instructions and default controller the Watlow SD temperature & humidity controllers. An SD controller can be identified by either an “SD” in the upper right corner or with an upper red/lower green led display.



Temperature is displayed in ºC
Relative Humidity is displayed in %RH

Change Set Point

From the Home screen (setpoint and actual shown as illustrated above), use the up and down arrow push-buttons to obtain the desired temperature and humidity setpoints.

Change Alarm

From the Home screen, press the Advance button until **A3.hi** appears in the lower display. Using the Up and Down arrow buttons, adjust the upper display to the desired alarm high setting. Press the Advance button until **A3.Lo** appears in the lower display. Using the Up and Down arrow buttons, adjust the upper display to the desired alarm low setting. Press the Infinity key to return to the home page.

Controller Calibration / Offset

The following procedure outlines the steps for setting a temperature or humidity offset.

D. Press the advance key until CAL1 is in the lower display
E. Press the up or down keys to obtain the desired temperature or humidity offset
F. Press the Infinity key to return to the home page

Controller Parameters

Controller parameters are factory set and should not be changed. Incorrect controller parameters will result in poor performance and are not covered under warrantee. If parameter re-setting to factory default values is needed, consult CARON service.

APPENDIX C – 230 V (Optional) Unit

The Caron Model 6030, 6031, 6032 230 V unit is the same as the 115 V with minor modifications they are as follows:

Power

PLEASE READ CAREFULLY!

The power specifications of this unit are 230V 15A 50/60 Hz.
For personal safety, this chamber must be properly grounded.
The power cord of this chamber has no electrical plug and must be hard wired, or the appropriate plug installed before use.
CARON recommends that the chamber have a dedicated wall outlet.

DIURNAL LIGHTING SYSTEM (6012 & 6032)

The Diurnal Lighting System, also known as the Dual Setpoint/Light Cycle Timer System Model 6032 consists of two (2) light banks, with 2 lights per bank; one light per shelf on 4 of the five shelves, and a timer.

Note: Light Bank 1 (labeled light 1,2) Light Bank 2 (labeled light 3,4). Both light fixtures must be plugged in for light bank to work properly.

Refer to Diurnal Lighting System section in the manual for operation of this option.

CE Compliant Product

Declaration of Conformity CE 05

Caron Products and Services, Inc.
27640 State Route 7
Marietta, OH 45750 USA

Declares that the following product:

Designation:	6000 Series (when noted)
Model Number:	6010, 6030 (may have digits or numbers following)
Classification:	Electrical equipment intended for residential, commercial and lighting industrial environments
Rated Voltage:	220-240 ~ (ac)
Rated Frequency:	50Hz
Rated Power Consumption:	15 amps (when noted, equipment may also be rated 115VAC 60Hz)

Meets the essential requirements of the following European Union Directive(s) using the relevant section(s) of the normalized standards and related documents shown:

89/336/EEC Electromagnetic Compatibility Directive

EN 61326:2002	Laboratory Equipment, Immunity Measurement & Control requirements
EN 61000-4-2	Electrostatic Discharge
EN 61000-4-3	Radiated Susceptibility
EN 61000-4-4	Electrical Fast Transient
EN 61000-4-5	Lightning Surge
EN 61000-4-6	Conducted Disturbances Induced by RF Fields
EN 61000-4-8	Power Frequency Magnetic Field Immunity
EN 61000-4-11	Voltage Variations, Dips and Interruptions
EN 61000-3-2:2004	Harmonic Current Emissions
EN 61000-3-3:1995 +A1:2001	Voltage Fluctuations and Flicker
EN 55011:1998 +A1:1999 +A2:2002 Class A, Group 1	Radiated and conducted emissions

73/23/EEC Low-Voltage Directive as amended by 93/68/EEC

CE Marking Directive

EN 61010-1:1994 +A2:07/95	Safety requirements for electrical equipment for measurement, control, and laboratory use.

INFORMATION SHEET

CARON MODEL NO. _____

SERIAL NO. _____

CUSTOMER NAME _____

SHIP DATE _____